The FISK

RADIOLA

MODELS 53 and 166

•

Four Valve, Two Band, D.C. Operated

Superheterodynes

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TECHNICAL INFORMATION AND SERVICE DATA

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Amalgamated Wireless (Australasia) Ltd

WORLD WIDE WIRELESS

THE FISK RADIOLA, MODELS 53 and 166

Four Valve, Two Band, D.C. Operated, Superheterodynes

TECHNICAL INFORMATION

Electrical Specifications

TUNING RANGES		ALIGNMENT FREQUENCIES	
"Standard Medium Wave" (A)	1550-550 kilocycles	"Standard Medium Wave" (A)	1400 K.C. 600 K.C.
"Short Wave" (B)	16-50 metres	Short Wave" (B)	18 metres
Intermediate Frequency			460 K.C.
Power Supply Rating	200-260 volts D.C.	Power Consumption	90 watts

VALVE COMPLEMENT

(1) 6A7 .... Detector-Oscillator
(2) 6D6 .... I F. Amplifier
(3) 6B7 I.F. Amp., 2nd Det., A.V.C. and A.F. Amp.
(4) 43 .... Output Pentode
302 Barretter
6U5 or 6G5 Visual Tuning Indicator (Console)

Loudspeaker	AE7 (Mantel)	AJ2 (Console)
Loudspeaker Transformer	TG54E (Mantel)	TG116D (Console)
Loudspeaker Field Coil Resistance	1000 ohms (Mantel)	4500 ohms (Console)
Replacement Fuses		3 amps.
Dial Lamps		3.2 volts, .35 amps.

General Description

The constructional details of these chassis differ as to the location of the loudspeaker and the filter unit. The Mantel model has the loudspeaker and filter unit mounted on the chassis, but in the Console these components are located in the lower compartment of the cabinet, being connected to the chassis by means of cables and plugs. Electrically the receivers are practically identical.

The ballast resistor, formerly used, is replaced by a 302 Barretter, which protects the receiver by automatically compensating for variations in the power supply voltage.

Visual tuning is provided in the Console only, a 6U5 or 6G5 Visual Tuning Indicator being employed.

Features of the receivers include:

Chassis of high-grade steel heavily plated with cadmium as a protection against corrosion. . . . . . Robust and reliable components specially impregnated against moisture, thus ensuring highly efficient performance in all climates . . . . Chassis, tuning condenser and loudspeaker rubber mounted to prevent vibration. . . . . Coils fitted with magnetite cores giving improved sensitivity and selectivity. . . . . . Air trimmers and inductance tuning ensure permanent alignments and efficiency of delicately tuned radio and intermediate frequency circuits. . . . . The exclusive tuning condenser gives even spacing of call signs, making the tuning dial easy to read and allowing many more stations to be included without crowding.

Alignment Procedure

Unless it is felt certain that the alignment is incorrect it is not desirable to alter the adjustments from the factory setting. Alignment is necessary, however, if the adjustments have been altered from the original setting or repairs have been effected to any of the tuned circuits.

In aligning the tuned circuits it is important to apply a definite procedure, as tabulated below, and to use adequate and reliable test equipment. An A.W.A. Modulated oscillator, Type C1070, in conjunction with an output meter of conventional design, is ideal for the purpose.

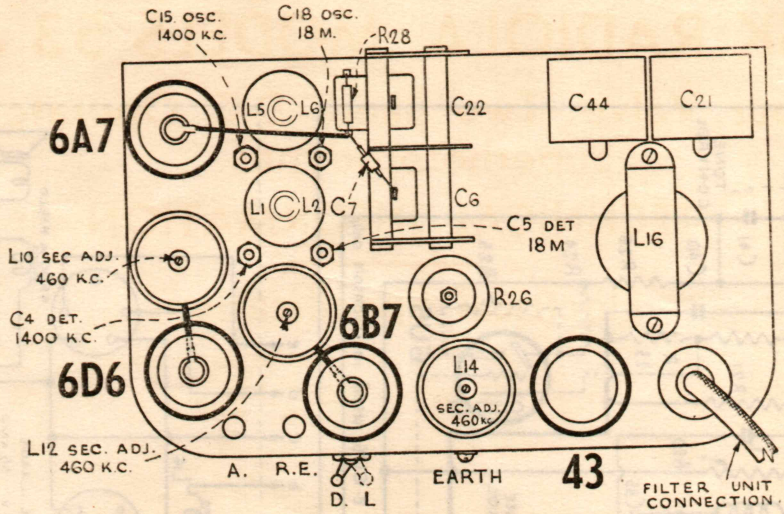


Fig. 1.—Lay-out Diagram (top view).

The R.F. circuits are aligned by plunger type air trimmers. A special tool Part No. 5371 is available for the alignment of air-trimmers. It is constructed of steel, with the adjustment tool on end and a deep centred socket wrench for locking the trimmer on the other. Owing to the construction of air-trimmers and their locations on the receiver chassis, alignment without the aid of this tool will be difficult. It will be found advantageous in adjusting the air-trimmers to rotate the plunger during the operation, in addition to using a steady pressure. As soon as the correct capacity is obtained, lock the trimmer with the tool to make the setting permanent.

The I.F. transformers and the oscillator circuit, at 600 K.C., are adjusted by magnetite cores inserted in the windings. The adjustment screws are shown in figs. 1 and 3, and these require the use of a non-metallic screwdriver, since the self-capacity of a metal screwdriver will render accuracy most difficult. A special tool part No. 5372 is also available for this purpose, which in addition to being non-metallic fits conveniently over the adjustment screw, simplifying the operation.

See that a 250,000 ohms resistor is connected between the output terminals of the test oscillator.

Connect the ground connection of the test oscillator to the chassis of the receiver during alignment and when aligning the I.F. stages, remove the grid clip from 6A7 before connecting the oscillator.

Perform alignment in the proper order, starting with No. 1 and following all operations across, then No. 2, etc. Adjustment locations are shown in figs. 1 and 3. Keep the volume control set in the maximum clockwise position and regulate the output of the test oscillator so that a minimum signal is applied to the receiver to obtain an observable output indication. This will avoid A.V.C. action and overloading.

"Approx. 550 K.C. no signal," mentioned in the chart, means that the receiver should be tuned to a point at or near 550 K.C. where no signal or interference is received from a station or local (Heterodyne) oscillator.

The term "Dummy Aerial" means the device which should be connected between the output cable of the Modulated Oscillator and the aerial terminal of the Receiver, on short waves only, to simulate the characteristics of the average aerial. The "Dummy Aerial" in this case is a 400 ohms non-inductive resistor.

To check the calibration of the receiver, connect an aerial and an earth wire and tune a broadcasting station of frequency between 700 and 550 K.C. If an error is apparent, re-set the pointer by loosening the set screw. Then repeat adjustments 8 and 9 of the chart.

Alignment Order	Oscillator Connection to Receiver	Dummy Aerial	Oscillator Setting	Receiver Dial Setting	Circuit to Adjust	Adjustment Symbol	Adjust to Obtain
1	6A7 Det.-Osc. Grid Cap	—	460 K.C.	Approx. 550 K.C. No signal	3rd I.F. Trans.	L14	Max. (peak)
2	6A7 Det.-Osc. Grid Cap	—	460 K.C.	Approx. 550 K.C. No signal	3rd I.F. Trans.	L13	Max. (peak)
3	6A7 Det.-Osc. Grid Cap	—	460 K.C.	Approx. 550 K.C. No signal	2nd I.F. Trans.	L12	Max. (peak)
4	6A7 Det.-Osc. Grid Cap	—	460 K.C.	Approx. 550 K.C. No signal	2nd I.F. Trans.	L11	Max. (peak)

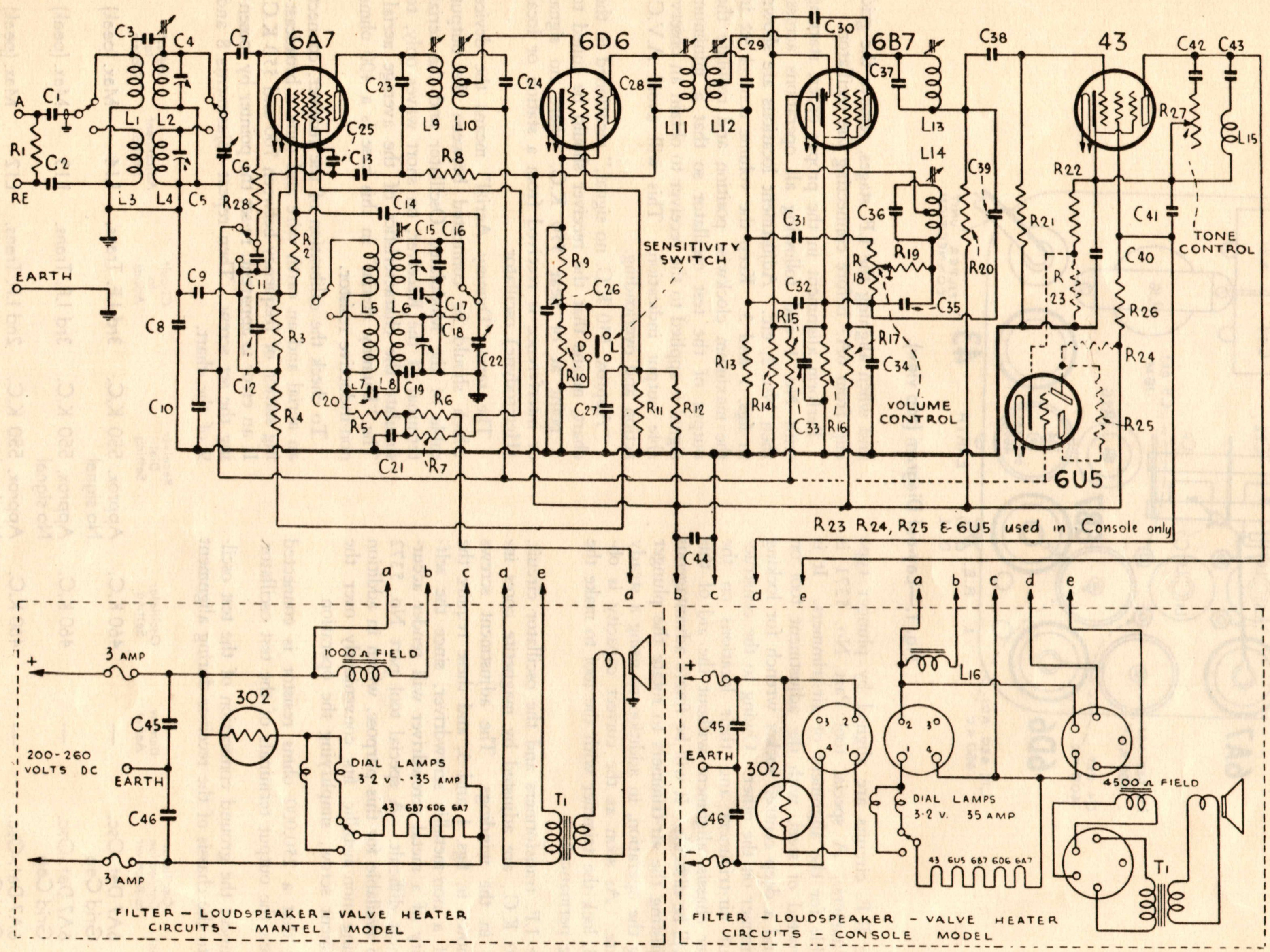


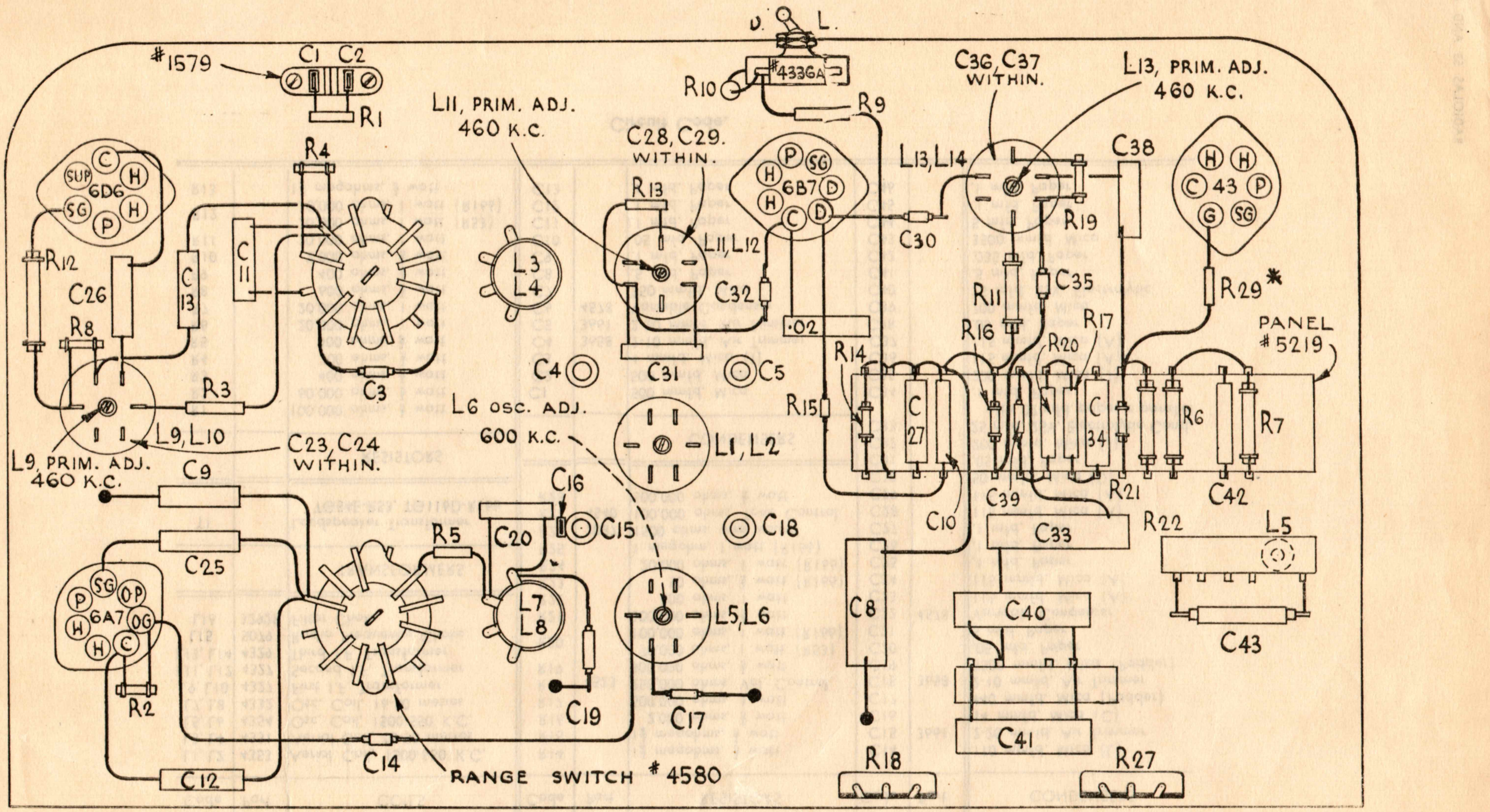
Fig. 2.—Circuit Diagram.

Code	Part	COILS
L1, L2	4353	Aerial Coil, 1500-550 K.C.
L3, L4	4331	Aerial Coil, 16-50 metres
L5, L6	4354	Osc. Coil, 1500-550 K.C.
L7, L8	4332	Osc. Coil, 16-50 metres
L9, L10	4327	First I.F. Transformer
L11, L12	4327	Second I.F. Transformer
L13, L14	4329	Third I.F. Transformer
L15	5079	Radio Frequency Choke
L16	3292B	Filter Choke
		TRANSFORMERS
T1		Loudspeaker Transformer TG54E-R53, TG116D-R166
		RESISTORS
R1		100,000 ohms, ⅓ watt
R2		60,000 ohms, ⅓ watt
R3		400 ohms, ⅓ watt
R4		200 ohms, ⅓ watt
R5		400 ohms, ⅓ watt
R6		20,000 ohms, 1 watt
R7		20,000 ohms, 1 watt
R8		600 ohms, ⅓ watt
R9		400 ohms, ⅓ watt
R10		2,000 ohms, ⅓ watt
R11		20,000 ohms, 1 watt
R12		20,000 ohms, 1 watt (R53) 30,000 ohms, 1 watt (R166)
R13		1¾ megohms, ⅓ watt

Code	Part	RESISTORS
R14		1¾ megohms, ⅓ watt
R15		1¾ megohms, ⅓ watt
R16		2,000 ohms, ⅓ watt
R17		500,000 ohms, 1 watt
R18	4523	250,000 ohms, Vol. Control
R19		300,000 ohms, ⅓ watt
R20		70,000 ohms, 1 watt (R53) 100,000 ohms, 1 watt (R166)
R21		300,000 ohms, ⅓ watt
R22		500 ohms, 1 watt
R23		50 ohms, ⅓ watt (R166)
R24		20,000 ohms, 1 watt (R166)
R25		1 megohm, 1 watt (R166)
R26	2087	1500 ohms, wire wound
R27	4540	100,000 ohms, Tone Control
R28		500,000 ohms, ⅓ watt
		CONDENSERS
C1		500 mmfd. Mica
C2		500 mmfd. Mica
C3		4 mmfd. Mica (I)
C4	3658	2-10 mmfd. Air Trimmer
C5	3661	2-20 mmfd. Air Trimmer
C6	4578	Variable Condenser
C7		350 mmfd. Mica
C8		.5 mfd. Paper
C9		.1 mfd. Paper
C10		.05 mfd. Paper
C11		.1 mfd. Paper
C12		.1 mfd. Paper
C13		.1 mfd. Paper

Code	Part	CONDENSERS
C14		110 mmfd. Mica (L)
C15	3661	2-20 mmfd. Air Trimmer
C16		14 mmfd. Mica (C)
C17		440 mmfd. Mica (Padder)
C18	3658	2-10 mmfd. Air Trimmer
C19		3500 mmfd. Mica (Padder)
C20		.05 mfd. Paper
C21		5 mfd. Paper
C22	4578	Variable Condenser
C23		115 mmfd. Mica (A)
C24		115 mmfd. Mica (A)
C25		.1 mfd. Paper
C26		.1 mfd. Paper
C27		.1 mfd. Paper
C28		115 mmfd. Mica (A)
C29		115 mmfd. Mica (A)
C30		50 mmfd. Mica (D)
C31		.05 mfd. Paper
C32		200 mmfd. Mica (J)
C33		25 mfd. 25V. Electrolytic Cond. with .02 mfd. paper in parallel
C34		.1 mfd. Paper
C35		200 mmfd. Mica (J)
C36		115 mmfd. Mica (A)
C37		115 mmfd. Mica (A)
C38		.05 mfd. Paper
C39		700 mmfd. Mica
C40		25 mfd. 25V. Electrolytic
C41		.5 mfd. Paper
C42		.035 mfd. Paper
C43		3500 mmfd. Mica
C44		5 mfd. Paper
C45		.1 mfd. Paper
C46		.1 mfd. Paper

Circuit Code.



* *R29-100,000 ohms $\frac{1}{3}$ watt.*

Fig. 3.—Lay-out Diagram (underneath view).

Alignment Order	Oscillator Connection to Receiver	Dummy Aerial	Oscillator Setting	Receiver Dial Setting	Circuit to Adjust	Adjustment Symbol	Adjust to Obtain
5	6A7 Det.-Osc. Grid Cap	—	460 K.C.	Approx. 550 K.C. No signal	1st I.F. Trans.	L10	Max. (peak)
6	6A7 Det.-Osc. Grid Cap	—	460 K.C.	Approx. 550 K.C. No signal	1st I.F. Trans.	L9	Max. (peak)
			Repeat the above adjustments before proceeding.				
7	Aerial Term.	—	600 K.C.	600 K.C.	Oscillator	L6 Osc. 600 K.C.	Max. (peak)
8	Aerial Term.	—	1400 K.C.	1400 K.C.	Oscillator	C15	Max. (peak)
9	Aerial Term.	—	1400 K.C.	1400 K.C.	Detector	C4	Max. (peak)
10	Aerial Term.	—	600 K.C.	600 K.C.†	Oscillator	L6 Osc. 600 K.C.	Max. (peak)
			Repeat adjustments 8 and 9 before proceeding.				
11	Aerial Term.	400 ohms.	18 metres	18 metres	Oscillator	C18	Max. (peak)*
12	Aerial Term.	400 ohms.	18 metres	18 metres†	Detector	C5	Max. (peak)‡

† Rock the tuning control back and forth through the signal.
* Use minimum capacity peak if two peaks can be obtained.
‡ Use maximum capacity peak if two peaks can be obtained.

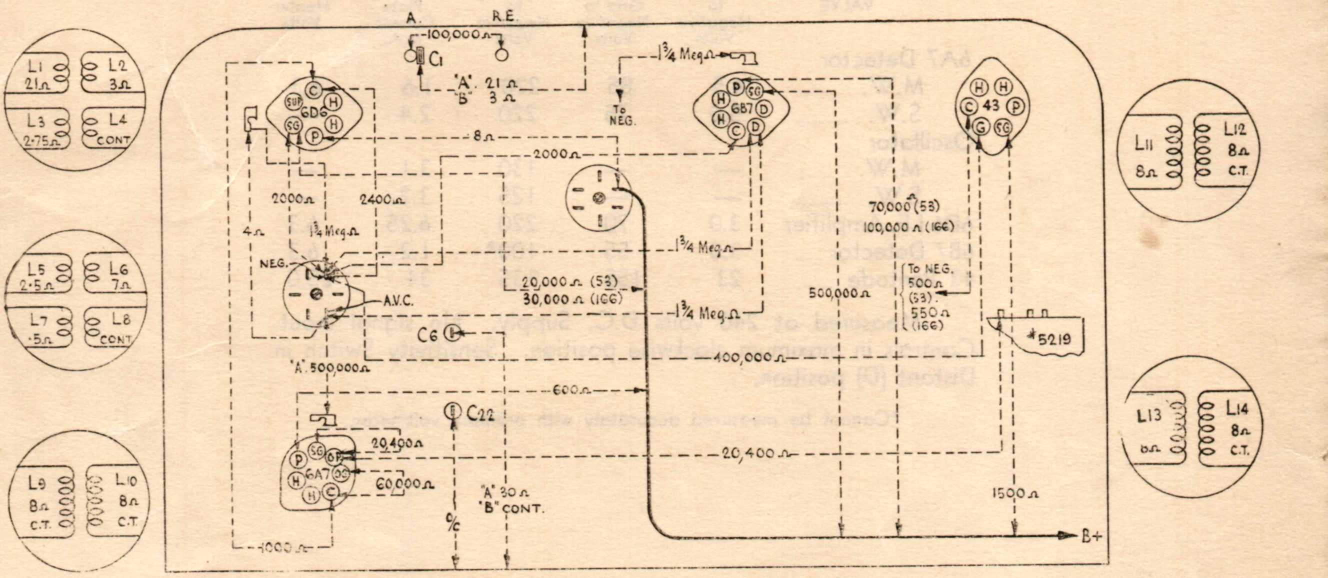


Fig. 4.—Resistance Diagram.

Resistance values were taken with valves removed, variable condenser in full mesh, volume control in maximum clockwise position and sensitivity switch at Local (L.)

CIRCUIT MODIFICATIONS.

In the Mantel model only, a 100,000 ohms ⅓ watt resistor has been inserted between C38 and the control grid of the 43 pentode as from the 1/3/38.

As from the 29/3/38, resistor R26 and condenser C41 are deleted in the Mantel model only, the screen grid of the 43 now being fed direct from B+.

SHORT WAVE INSTABILITY.

Reference to the circuit code will show a .02 ufd paper condenser connected in parallel with C33. This has been done to provide a more efficient filter, giving greater stability on the high frequency end of the short wave band.

RESISTANCE MEASUREMENTS.

The resistance values shown in fig. 5 have been carefully prepared so as to facilitate a rapid check of the circuit for irregularities. To obtain the full benefit from this diagram it is advisable to consult the circuit and layout diagrams when conducting the check. Each value should hold within ±20%. Variations greater than this limit will usually be a pointer to trouble in the circuit.

SOCKET VOLTAGES (Mantel)

VALVE	Cathode to Negative Volts	Screen Grid to Negative Volts	Plate to Negative Volts	Plate Current M.A.	Heater Volts
6A7 Detector					
M.W.	4.20	75	180	1.3	6.3
S.W.	4.5	80	180	1.8	—
Oscillator					
M.W.	—	—	122	3.3	—
S.W.	—	—	124.75	3.3	—
6D6 I.F. Amplifier	2.6	80	180	5.2	6.3
6B7 Detector	3.0	33	100*	1.1	6.3
43 Pentode	18	130	110	30	25.0

Voltage across loudspeaker field—57.5 volts.

Measured at 240 volts D.C. supply. No signal input. Controls in maximum clockwise position.

*Cannot be measured accurately with ordinary voltmeter.

SOCKET VOLTAGES (Console)

VALVE	Cathode to Negative Volts	Screen Grid to Negative Volts	Plate to Negative Volts	Plate Current M.A.	Heater Volts
6A7 Detector					
M.W.	4.5	85	220	1.6	6.3
S.W.	5.0	75	220	2.4	—
Oscillator					
M.W.	—	—	130	3.1	—
S.W.	—	—	125	3.2	—
6D6 I.F. Amplifier	3.0	70	220	6.25	6.3
6B7 Detector	3.0	55	100*	1.2	6.3
43 Pentode	23	155	135	34	25.0

Measured at 240 volts D.C. Supply. No signal input. Controls in maximum clockwise position. Sensitivity Switch in Distant (D) position.

*Cannot be measured accurately with ordinary voltmeter.